ATOMIC ENERGY letter

THE FIRST AND ONLY

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Dear Sir:

Reduction of costs of generating nuclear power is the key to emerging nuclear power in the next twenty years, the USAEC reported last fortnight to the Joint Congressional Committee on Atomic Energy which is considering revisions to the Atomic Energy Act (1946). It pointed out that if cost reductions, to a four-to-seven mills per kilowatt hour range, are accomplished in the next fifteen to twenty years, several million kilowatts of nuclear power plant capacity could be placed in service by 1975. (Excerpts from report on economic nuclear power: page 2 this LETTER). (Meanwhile, a conflict over proposed new language in the revised Act, which would have designated the Chairman of the USAEC as "principal officer", has now been resolved. Through the objections of the USAEC members, language to give the members equal responsibility and authority was substituted, and the chairman was designated as "official spokesman" of the Commission.)

Nuclear engineering problems will be discussed in seven papers which the American Society of Mechanical Engineers will hear at its semi-annual meeting June 20-24, Pittsburgh. "Working Stress Criteria for Nuclear Power Plants" will be discussed by B. F. Langer, atomic power division, Westinghouse Electric Corp., Pittsburgh. Three other papers by men from this Westinghouse division will also be heard: "Comparative Performance of Turbine Generator Units in Saturated Steam Cycles", will be discussed by N. A. Dedecos; "The Thermal Design of Nuclear Power Reactors", will be presented by N. J. Palladini; and "A Test Loop for Determining Heat Transfer Coefficients by the Thermal Cyclic Method" will be discussed by L. S. Mims and J. A. Kleber. Other papers will be by C. R. Stahl, of the reactor design unit, Knolls Atomic Power Laboratory, who will discuss "The Mechanical Design of Liquid Metal Cooled Nuclear Reactors"; and S. K. Hellman, and others, of the machine circulating unit, Knolls Atomic Power Laboratory, who will discuss "The Use of Numerical Analysis in the Transient Solution of a Two-Dimensional Heat Transfer Problem with Natural and Forced Convection".

The industrial applications of nuclear energy, with particular reference to radioisotopes, will be covered in a short course to be given at Purdue University from July 12-23. The course is designed to aid in meeting the shortage of trained people in the field of radiochemistry.....A graduate course in the application of nuclear energy to industrial uses is now being offered by Illinois Institute of Technology. Classes are scheduled to begin the week of September 20th. Inquiries should be directed to the Institute at 3300 Federal St., Chicago.

Businessmen who are not now taking steps to protect their facilities against atomic attack are courting disaster not only for their own plants, but for the country as a whole, Val Peterson, Federal Civil Defense Administrator told a recent meeting of the Armed Forces Chemical Association, in Washington. The FCDA is relying on each industry and plant to take steps to ensure protection for individuals and equipment, he pointed out.

Subscription rates: United States, U.S. possessions, and Canada, $18.00 a year. Latin America, $20.00 a year. All other countries, $25.00 a year.

The Probable Course of Industrial Development of Economic Nuclear Power. Portions of interest from a section (by that title) of the USAEC's report to the Joint Congressional Committee on Atomic Energy; issued last fortnight in connection with hearings in Washington on amending the Atomic Energy Act (1946).

In considering the proposed legislation (the USAEC told the Joint Committee) we think certain essential factors must be clearly recognized, namely: a.- That nuclear power is not yet an economic reality in the competitive cost sense, and b.- That the big job of driving costs down to levels competitive with conventional electric energy can best be accomplished by joint effort of both industry and government as a working team.

Therefore, looking ahead over the next ten to twenty years, we see certain key factors in achieving and applying economic nuclear power:

First, there is the matter of time. We are now in the development stage. The five year reactor program (of the USAEC) is aimed at making competitive nuclear power a reality. If the goal is accomplished, only a small number of full-scale, privately-owned and operated nuclear power reactors are likely to be on the line before 1965.

Second, there is the Nation's future energy resource base. In the United States, the mounting demands for energy in all forms, the unpredictable long-term supply of fuels now in use (particularly oil and natural gas), and the limited number of major hydro-electric sites make the mastering of a new source of energy an essential goal. The principal effect of realizing economic nuclear power from nuclear fuel will be to establish a strong restraining force against the pressures toward higher costs of power owing to rising fuel costs.

Third, we must consider what economically competitive nuclear power means in the United States, compared with other forms of energy, and how large the market for it may be. Reduction of costs of generating nuclear power is the key to emerging nuclear power in the next twenty years, or as long as fossil fuels remain cheap and abundant in this country. Unless generating costs can, by successful development work, and operating experience, be brought down to about 8 mills per kilowatt-hour, nuclear power would find little market on economic grounds in the United States. Even at a level of about 8 mills, the market would be confined to regions with high power costs. To become widely competitive with efficient new steam electric plants in the United States, nuclear power generating costs would have to be reduced to the range of 4 to 7 mills per kilowatt hour. Achieving such cost levels is not certain at this stage, but the probability of success is good.

Fourth, there is the question of displacement and impact on existing plants, labor and capital investment. Projections of United States power demand by the Paley Commission indicate a growth of generating capacity from nearly 100 million kilowatts now, to about 300 million kilowatts in 1975, to satisfy an increased demand in 1975 of some 900 billion kilowatt-hours more than present levels. Thus, tens of millions of kilowatts of nuclear power capacity could be absorbed without displacing any existing capacity. In addition, heavy power-consuming industries (such as aluminum and other electroprocess industries), may find nuclear energy to have major direct significance, provided generating costs can be brought down to the low four-to-five mill level.

Finally, we must consider the possibilities of nuclear power in foreign countries. In many countries, energy sources are scanty, more costly, or more nearly depleted than in the United States. Thus, the economic benefits of nuclear power in some foreign countries may appear earlier and be more pervasive than initially in the United States.

At present, atomic energy in the United States is a Government-owned industry. This departure from the normal pattern of industrial enterprise in this country was deemed necessary to cope with the unique and unfamiliar characteristics of atomic energy and because its products (in 1946) then went almost entirely into our military arsenals.

It is our belief that nuclear power, as it becomes economically attractive, should be integrated into the existing power economy of the United States; that nuclear power should be produced and distributed by the private and public power systems, rather than by the USAEC.

NEW PRODUCTS, PROCESSES & INSTRUMENTS...for nuclear work...

FROM THE MANUFACTURERS:- New radioactivity monitor, model 1619, is for use with a Geiger counter for (1) routine surveying for alpha, beta, or gamma contamination in radioisotope laboratories, (2) detecting large fluctuations in cosmic ray and other laboratory "background", and (3) routine measurements of radioactivity for medical diagnosis and treatment, tracer work, or process control in industry. Four ranges are provided which cover any radiation intensity up to 20,000 counts per minute. The manufacturer states that the instrument is free from zero drift, and possesses stable calibration. A built-in loud speaker is provided for an additional indication of radioactivity; a chart type recorder may be connected to this instrument to provide a written record of radiation intensity vs. time. --Nuclear Instrument & Chemical Corp., Chicago 10, Ill.

NOTES: Construction of two heavy particle accelerators, with the USAEC contributing $1,200,000 for the construction of each accelerator, will now be undertaken at Yale University and the University of California Radiation Laboratory. Both machines will be linear accelerators; the one at UCRL will be used primarily in nuclear chemistry studies, while the machine at Yale will be used principally in studies of the physics of heavy particle nuclear interactions. Accelerating energies of the machines will be approximately 10 million electron-volts.

BUSINESS NEWS...in the nuclear field...

NEW CONTRACTOR SELECTED FOR POWER REACTOR:- Stone & Webster Engineering Corporation, Boston, has now been selected to handle architect-engineering services in connection with the design of the nuclear portion of the pressurized water reactor project which will be constructed at a site near Shippingport, Pa., and which will be the first electric utility generating power by nuclear means. Stone & Webster will be a subcontractor under Westinghouse Electric, which has responsibility for development, design and construction of the nuclear portion of this project, under its prime contract with the USAEC. The turbine-generator portion of this plant will be designed and constructed by the Duquesne Light Co., Pittsburgh, which will also operate the plant. The subcontract with Stone & Webster is of the cost-reimbursement type. Work to be performed by Stone & Webster will include design and preparation of plans and specifications for the reactor foundations; reactor building; fuel handling facilities; and certain other auxiliaries required for operation of the plant.

NAVY CONTRACT AWARDED:- A U. S. Navy contract has now been awarded Tracerlab, Inc., Boston nuclear products firm, for 9,000 self-luminous deck and personnel markers activated with Strontium-90. The markers can be made in many ways and may be used for specific personnel identification through the use of different colors, for unit identification in amphibious operations, for marking ammunition boxes, bulkheads, life rafts; for light sources for underwater demolition teams; and for other purposes. The Strontium-90 markers replace radium markers previously used for similar purposes, as there is less radiation hazard to personnel from strontium. The new markers also can be made in practically all the colors of the visible spectrum, ranging from blue to red-orange; have a higher degree of brightness; and also have a longer useful life. The markers can be made to have a maximum brightness value of 80 effective microlamberts, or about twice the brightness of a sheet of white paper in full moonlight. This is ten times as bright as the radium-excited markers that have been used for many years.

ELECTRIC UTILITIES EXECUTIVES HEAR NUCLEAR ENERGY DESCRIBED:- Interest of electric utilities in nuclear energy as a future power source was reflected in the remarks of speakers at the meeting last fortnight of the Edison Electric Institute, at Atlantic City. Walter H. Sammis, president of the Institute, emphasized that the future of electric power in the United States lay in further development of heat sources. Stressing that many power companies were actively engaged in research directed toward nuclear power generation, he said that atomic fuel is the "new horizon" for electricity generation. Dr. John R. Dunning, Columbia University, told the Institute that reserves of nuclear fuel are "many, many times that of our conventional fuels". Robert Le Baron, chairman of the military liaison committee to the USAEC, pointed out that the United States "already possesses a multi-billion dollar atomic inheritance in manufacturing facilities and trained personnel" and that the power potential of this new industry was "enormous".

RAW MATERIALS...radioactive mineral & ore development & production...

UNITED STATES:- Colorado-A current list of applicants for leases on properties prospected by the Geological Survey, for the USAEC, is indicative of the widespread interest in uranium operations. Included are Vanadium Corp. of America; Climax Uranium; U. S. Vanadium; Golden Cycle Corp.; La Salle Mining Co.; Shattuck-Denn Mining Co.; Newmont Mining Corp.; Coronado Copper & Zinc Co.; Eagle-Picher Co.; Hunt Oil Co.; Homestake Mining Co.; Kerr-McGee Oil Industries; Leadville Lead Corp.; Miami Copper Co.; Phelps-Dodge Corp.; The Pittston Co.; Rico Argentine Mining Co.; Spring Canyon Coal Co.; and J. R. Simplot Co.

CANADA:- The annual statement to stockholders of Baska Uranium Mines shows that in 1953 Baska conducted intensive work on many of the claims it holds. It explored its Griff Lake group of 29 claims, in the Beaverlodge area, Northern Saskatchewan; made a Geiger survey on its 11-claim group in the Fredette Lake district; drilled some 46 holes on the 23-claim Melville Lake group; and conducted systematic prospecting as well as a Geiger counter survey at its Milliken Lake property.....At Rare Earths Mining Corp.'s Bancroft area property, Eastern Ontario, a 23.6-ft. core length has averaged 0.124% uranium oxide, according to an official of that firm. Results were from the Otter zone there. Another hole in the immediate vicinity showed 0.33% uranium oxide for a 3-ft. core length, it was stated.....A new program of diamond drilling has been started by Goldfields Uranium Mines on its holdings in the Beaverlodge area, Northern Saskatchewan. The first work will explore a discovery made last Fall at the Caput Lake section of Goldfields main property there. (The find consisted of five veins, rather closely spaced, which gave high Geiger readings. One vein, traced for 514-ft., averaged 1.83% uranium oxide across 1-foot.)

NEW BOOKS & OTHER PUBLICATIONS...on nuclear subjects...

Proposed Act to Amend Atomic Energy Act of 1946; April, 1954. As prepared by the Joint Congressional Committee on Atomic Energy, 83rd Congress, 2nd Session. 44 pages. (20¢).....Design Standards for Protective Construction in Industrial Structures. Atomic bomb protection, as formulated by Federal Civil Defense Administration. (5¢).....Superintendent of Documents, Wash. 25, D.C.

NUCLEAR WORK ABROAD...

United Kingdom: Instrumentation- Last month American, Canadian, and British scientists and engineers met at the Atomic Energy Research Establishment, Harwell, in a discussion of instrumentation problems associated with the atomic energy projects of their respective countries. Subjects discussed included the instrumentation and control of nuclear reactors; the use of transistors in nucleonic instruments; radiation dosimetry; and the reliability of nucleonic instruments and components. This was the fourth Tripartite Conference devoted to instrumentation, and the second which has been held in Great Britain. Meetings were held under the chairmanship of Dr. Denis Taylor, of the A.E.R.E., Harwell.

Reactors- Certain details of the two atomic piles, and the associated chemical separation plants at Windscale, near Sellafield, were recently shown publicly, for the first time, when representatives of the press were shown piles in operation; primary separation plant; uranium purification plant; solvent recovery equipment; and the supporting units. The piles of Windscale consist of a central core of graphite blocks, with horizontal channels; uranium, canned in aluminum rods, is laid in these channels, while the whole assembly is surrounded by a graphite reflector. (Cooling is by forced air; discharge is from two 412-ft. chimneys, and it is not utilized. However, another atomic pile, at Calder Hill, nearby, now under construction, will utilize its heat for electric power generation; the plutonium produced at Calder Hill be a by-product.) At the Windscale plutonium purification operation, to minimize fire risk the entire plant is operated in an atmosphere of inert gas. The wastes from Windscale are divided into three grades: low activity, medium, and high. Highly active effluent is held in underground tanks; research is being directed toward methods of concentrating and evaporating such effluent to reduce storage space needed. The medium effluent, after being held for some 2 to 3 years when its activity is down to the low phase, is pumped some 2 miles out to sea.

ATOMIC PATENT DIGEST...recent U. S. grants in the nuclear field...

Shielded, explosively released fastener. The combination of two members spaced from each other, with a tie rod located between the members and having an explosive charge in each end, with means for separately detonating each charge. A shield, which surrounds the rod and engages the members, has an internal diameter greater than the outer diameter of the tie rod so that the shield is spaced from the rod on all sides. U.S. Pat. No. 2,679,783 issued June 1st, 1954; assigned to United States of America (USAEC). (Inventor: Phillips P. Smith.)

Electrical manipulator. A remote control manipulator comprising (in part) a support unit, including a cantilever, which is movable horizontally, and a carriage located on this cantilever. Tongs (movable jaws) are mounted on an elongated tube unit. An electrical control box, remote from the tongs, controls three reversible motors, which, through gearing, rotate the tongs about three axes separately or combined. A fourth reversible motor, also connected through the control box, operates the jaws. U. S. Pat. No. 2,679,940 issued June 1st, 1954; assinged to United States of America (USAEC). (Inventors: R. C. Goertz and D. F. Uecker.)

Low melting alloy. A new neutron absorbing ternary alloy consisting of about 54 to 62% by weight of indium, about 8 to 18% by weight of cadmium, and the remainder bismuth. U. S. Pat. No. 2,680,071 issued June 1st, 1954; assigned to United States of America (USAEC). (Inventors: L. F. Epstein, W. H. Howland and M. D. Powers.)

Method and apparatus for making a radiograph of a selected section through a body which includes (in part) positioning a point source of radiation on one side of a body on a line perpendicular to a selected plane in the body section, with a radiation-sensitive medium on the other side of the body. During the exposure the distance between the point source and the medium is continually changed by moving the point source and the medium at rates that maintain the distance ratio, whereby the magnified image of the body structure remains constant during the exposure period, while the images corresponding to other planes change in magnification. U. S. Pat. No. 2,680,199 issued June 1st, 1954, to Martin S. Abel, Oakland, Calif.

Neutron well logging, to determine the character of formations traversed by a bore hole. Comprises (in part) a source of neutrons, and a detector of thermal neutrons, with a hydrogenous substance surrounding the detector, while a layer of substance that absorbs thermal neutrons surrounds the hydrogenous substance. Means are provided for lowering the elements into the borehole, so that the formations adjacent to the hole are irradiated with neutrons from the source, and additional electronic circuitry. U. S. Pat. No. 2,680,201 issued June 1st, 1954 to Serge A. Sherbatskoy, Tulsa, Okla.

Protective circuit, for pairs of parallel-connected gaseous discharge tubes having trigger means producing a trigger pulse energizing these tubes for simultaneous operation of the tubes of each pair. Comprising (in part) relay means connected to the trigger means, monitor tubes connected in the circuit with the relay means for actuating it by conduction of one of the monitor tubes, with means for impressing the trigger pulse on alternate monitor tubes for controlled conduction in response to operating faults of the gaseous discharge tube. U. S. Pat. No. 2,680,212 issued June 1st, 1954; assigned to United States of America (USAEC). (Inventor: Philip E. Frazier.)

Polaroscope. The combination of an electrolytic cell having means for forming an electrode surface within a liquid; and a voltage generator for generating a voltage wave that varies instantaneously as a predetermined function of time elapsed from the instant operation is initiated. Comprises (in part) an amplifier; an initiator adapted to generate a voltage wave that is proportional to the rate at which the electrode surfaces are formed within the electrolytic cell; and an indicator to show current variations at the electrode surface as a function of the voltage generated by the voltage generator. U. S. Pat. No. 2,680,227 issued June 1st, 1954; assigned to United States of America (USAEC). (Inventor: Quentin A. Kerns.)

Sincerely,

The Staff,
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